AMENDMENTS TO THE CLAIMS

1 – 18 Cancelled

19. (new) An apparatus for denoising an input noisy signal, the apparatus comprising:

one or more memories; and

a controller that

receives the noisy signal z that includes a number of sequentially ordered symbols, each symbol having a position,

stores the noisy signal z in the one or more memories,

receives a signal r, output from a preliminary denoising system that operates on the received noisy signal z, that includes a number of sequentially ordered symbols, each symbol having a position,

stores the signal r in the one or more memories, and

produces an output signal z' by replacing a symbol within each of a number of different subsequences that occur in the noisy signal z with a corresponding replacement symbol that the controller computes to provide a minimal estimated signal degradation.

20. (new) The apparatus of claim 19 wherein the controller produces the output signal z' by:

for each of a number of different symbol subsequences, $z(q)$, about symbol z_q, that occur in the received noisy signal z,

counting a number of occurrences of each symbol at the corresponding positions p in signal r, r_p, for positions p in the received noisy signal z at which $z(p)$ is equal to $z(q)$ and storing the counted number of occurrences in the one or more memories; and

for each of the number of symbol subsequences, $z(q)$, in the received noisy signal z,

replacing symbol z_q of subsequence $z(q)$ in all occurrences of subsequence

$z(q)$, at positions z_p, in the noisy signal z with a replacement symbol $z_q^{'}$ which produces a minimal computed signal degradation.

21. (new) The apparatus of claim 20 wherein the one or more memories store:

a degradation function C() that ;

the received noisy signal z;

the signal r; and

the counts of the number of occurrences of each symbol at the corresponding positions p in signal r, r_p, for positions p in the received noisy signal z at which $z(p)$ is equal to $z(q)$.

22. (new) The apparatus of claim 21 wherein the replacement symbol $z_q^{'}$ for symbol z_q of subsequence $z(q)$ is computed as a symbol that is computed to produce a least estimated signal degradation, using the degradation function C(), when $z_q^{'}$ is substituted for z_q in each occurrence of subsequence $z(q)$ in noisy signal z.

23. (new) The apparatus of claim 22 wherein the estimated signal degradation produced by replacing symbol z_q of each occurrence of subsequence $z(q)$ with symbol $z_q^{'}$ is computed as:

$$\text{degradation} = \sum_{p} C\left(r_p, z_q^{'}\right)$$

where $C\left(r_p, z_q^{'}\right)$ is the degradation estimated for replacing the symbol r_p at position p in the signal r with symbol $z_q^{'}$; and

p represents the positions in the signals r and z at which $z(p)$ is equal to $z(q)$.

24. (new) The apparatus of claim 19 wherein a subsequence $z(q)$ is a number of symbols that precede, follow, or both precede and follow a symbol z_q at position q in noisy sequence z.

25. (new) The apparatus of claim 24 in which the number of symbols in a subsequence is determined by the controller to be sufficiently small to ensure that the number of occurrences of each subsequence is sufficiently large to provide a desired statistical significance to signal degradation estimation and sufficiently large to ensure that an adequate number of subsequence correlations contribute to denoising.

26. (new) A method for denoising a noisy signal and partially corrected signal to generate an output signal, the method comprising:

receiving the noisy signal z that includes a number of sequentially ordered symbols, each symbol having a position,

storing the noisy signal z in one or more memories,

receiving the partially corrected signal r, output from a preliminary denoising system that operates on the received noisy signal z, that includes a number of sequentially ordered symbols, each symbol having a position,

storing the partially corrected signal r in the one or more memories, and

producing the output signal z' by replacing a symbol within each of a number of different subsequences that occur in the noisy signal z with a corresponding replacement symbol that the controller computes to provide a minimal estimated signal degradation.

27. (new) The method of claim 26 wherein the output signal z' is produced by:

for each of a number of different symbol subsequences, $z(q)$, about symbol z_q, that occur in the received noisy signal z,

counting a number of occurrences of each symbol at the corresponding positions p in signal r, r_p, for positions p in the received noisy signal z at which $z(p)$ is equal to $z(q)$ and storing the counted number of occurrences in the one or more memories; and

for each of the number of symbol subsequences, $z(q)$, in the received noisy signal z,

replacing symbol z_q of subsequence $z(q)$ in all occurrences of subsequence

$z(q)$, z_p, in the noisy signal z with a replacement symbol $z_q^{'}$ which produces a minimal computed signal degradation.

28. (new) The method of claim 27 further comprising computing the replacement symbol $z_q^{'}$ for symbol z_q of subsequence $z(q)$ as a symbol that producesa least estimated signal degradation, using the degradation function C(), when $z_q^{'}$ is substituted for z_q in each occurrence of subsequence $z(q)$ in noisy signal z.

29. (new) The method of claim 28 further comprising computing the estimated signal degradation produced by replacing symbol z_q of each occurrence of subsequence $z(q)$ with symbol $z_q^{'}$ as:

$$\text{degradation} = \sum_{p} C\left(r_p, z_q^{'}\right)$$

where $C\left(r_p, z_q^{'}\right)$ is the degradation estimated for replacing the symbol r_p at position p in the signal r with symbol $z_q^{'}$; and

p represents the positions in the signals r and z at which $z(p)$ is equal to $z(q)$.

30. (new) The method of claim 26 wherein a subsequence $z(q)$ is a number of symbols that precede, follow, or both precede and follow a symbol z_q at position q in noisy sequence z, the subsequence including symbol z_q.

31. (new) The method of claim 26 further comprising determining the number of symbols in a subsequence by selecting the number of symbols in a subsequence to be sufficiently small to ensure that the number of occurrences of each subsequence is sufficiently large to provide a desired statistical significance to signal degradation estimation and to be sufficiently large to ensure that an adequate number of subsequence correlations contribute to signal denoising.

32. (new) A computer readable medium encoded with a data processing program for

denoising a noisy signal and a partially corrected signal to generate an output signal by:

receiving the noisy signal *z* that includes a number of sequentially ordered symbols, each symbol having a position,

storing the noisy signal *z* in one or more memories,

receiving the partially corrected signal *r*, output from a preliminary denoising system that operates on the received noisy signal *z*, that includes a number of sequentially ordered symbols, each symbol having a position,

storing the partially corrected signal *r* in the one or more memories, and

producing the output signal *z'* by replacing a symbol within each of a number of different subsequences that occur in the noisy signal *z* with a corresponding replacement symbol that the controller computes to provide a minimal estimated signal degradation.